CHAPTER 10

MS – Excel Advanced

10. MS Excel Advanced

10.1 Charts

Charts are graphical representation of data in Excel. Through charts your audience can see meaning behind the numbers, and showing comparisons and trends becomes much easier.

A chart has many elements out of which some are displayed by default while others can be added as per requirement. You can also change the display or remove various chart elements.

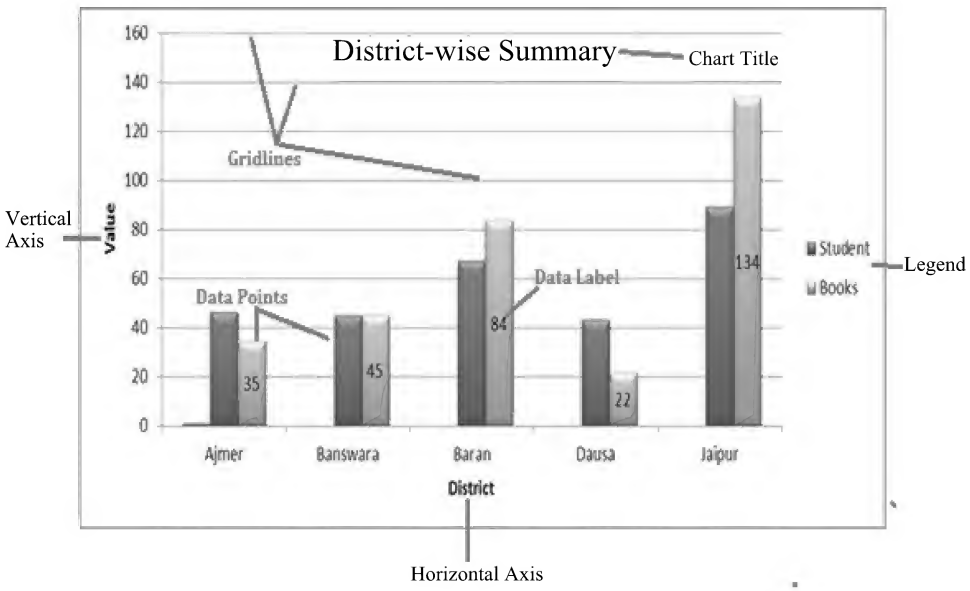


Figure 10.1: Chart

10.1.1 Elements of a Chart

Term	Meaning
Chart Title	Title illustrating Chart description
Data points	Data points are the horizontal bars, lines, columns and other data markers.
Data Series	Data points which are from the same row or column in a Worksheet are grouped together in data series. The data series includes all the related data points in a chart. If there are multiple data series in the chart they will have a different color or style.
Legend	It identifies which data series each color on the chart represents. For complex charts it is crucial element.
Vertical Axis or Value axis	The value axis is the numerical scale which shows the value of the data point. However, in a bar chart, the horizontal axis would be the value axis.
Horizontal axis or Category axis	It is the line where the various data series are organized. It is the horizontal part of the chart. However, in a bar chart, the vertical axis would be the category axis.
Data Labels	Actual value of the data point is called data label
Gridlines	Horizontal Lines displayed in plot area are called gridlines

Table 10.1 Elements of a Chart

QUICK REVIEW

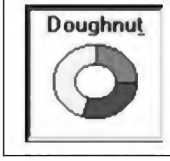
- Why is charting necessary in Excel?
- What are the different elements of a chart?

10.1.2 Charting Worksheet Data

Excel has a variety of chart types available for different purpose and different scenarios.Whenever we display data visually most important is choosing the right chart type. All charts display the data visually but different charts present the data in very different ways. For example **Line charts** are useful for showing changes over time whereas b are useful for showing the relationship of parts to the whole.

Frequent use of Excel 2010 will make you more familiar and proficient in choosing the perfect chart type available and the best formats for those chart types. Using the best chart type and format will help you display your data visually in the most meaningful way.

Sample	Chart Type	Description
	**Column**	A column chart allows comparison of two or more items in different categories. Values are represented as vertical bars. Each column represents a single value in the Worksheet. They are normally used to show variation of different items over a period of time. In a column chart categories appear horizontally and values appear vertically but in a bar chart category appears vertically.
	**Bar**	Bar charts are similar to column charts except that bars are represented horizontally rather than vertically. A bar chart emphasizes the comparison between items at a fixed period of time.
	**Pie**	Pie charts are mainly used to show contribution of each value to a total. Pie charts make it easy to compare shares. Each value is shown as a slice of the pie so it's easy to see which values make up the percentage of a whole. Pie charts contain just one chart data series. All values should be positive for this type of chart.
	**Line**	A line chart is ideal for showing trends over time, where regular time intervals are plotted on the horizontal or x-axis. In this data points are connected with lines making it easy to see whether values are increasing or decreasing over time. The line chart emphasizes trends rather than the amount of change.
	**Area**	An area chart shows both the change over time as well as the sum of these changes. They are similar to line charts, except the areas under the lines are filled in. An area chart shows the relative importance of values over time.

	**XY scatter**	XY charts or scatter charts are used to analyze the relationship between two sets of data points or variables and they compare pair of values. The data need not be regularly spaced unlike in a line chart. It uses numeric values along both axes in place of values along the vertical axis and categories along the horizontal axis. Legend is used to show what the lines represent.
	**Stock**	This chart is often used to illustrate stock prices. This chart can also be used for scientific data like indicating temperature changes.
	**Surface**	They can be used to pinpoint the high and low points resulting from two changing variables. Surface charts allow you to display data across a 3D landscape. They work best with large data sets allowing you to see a variety of info at the same time. Surface charts plot trends in values across two dimensions in a continuous curve. The trends in a surface chart imply the combined effects of two variables on a third. In order to use a surface you need minimum two data series both of which are numeric as with an XY chart.
	**Bubble**	A bubble chart is a kind of scatter chart. The size of the bubbles indicates the value of a third variable. To arrange your data place the x values in one row or column and corresponding y values and bubble sizes in the adjacent rows or columns.
	**Dough Nut**	The doughnut chart is a variation of the pie chart. The pie chart is restricted to one data series but doughnut chart doesnot have any such restriction.

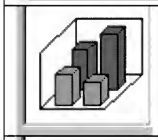
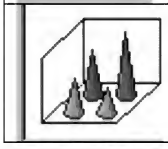
	**Radar**	A radar chart is used to show the relationship between individual and group results. It has a special use. Each category in a radar chart has its own axis radiating from the centre point. Data points are plotted beside each spoke and data points of same series are connected by lines.
	**Combination**	A combination chart places one type of chart with another. It is very useful for showing relationships between different series.
	**3D charts**	There are 3D versions of many of the basic chart types.
	**Cone, cylinder and pyramid**	Cone, cylinder and pyramid data markers can give a dramatic effect to 3D column and bar charts.

Table 10.2 Chart types

USEFUL TIP

The cylinder, cone, and pyramid chart subtypes are actually just variations on the three 3-D Column subtypes. Select one of these column chart subtypes when you want to assign different shapes to the columns in your column chart.

QUICK REVIEW

- What are the different chart types available in Excel 2010?
- What is the difference between bar chart and column chart?

10.1.3 Creating a New Chart

1. Select the range of cells that contain the data you want to chart including the column and row headings. These cells will be the source data of your chart.

	A	B	C
1	City	Student	Books
2	Ajmer	46	35
3	Banswara	45	45
4	Baran	67	84
5	Dausa	43	22
6	Jaipur	89	134

Figure 10.2: Range Selection

2. Click the Insert tab on Ribbon and In the Charts group, select the desired chart category as per figure below:

Figure 10.3: Chart Category Selection

3. Select the thumbnail of desired chart type from the drop-down gallery as per figure below:

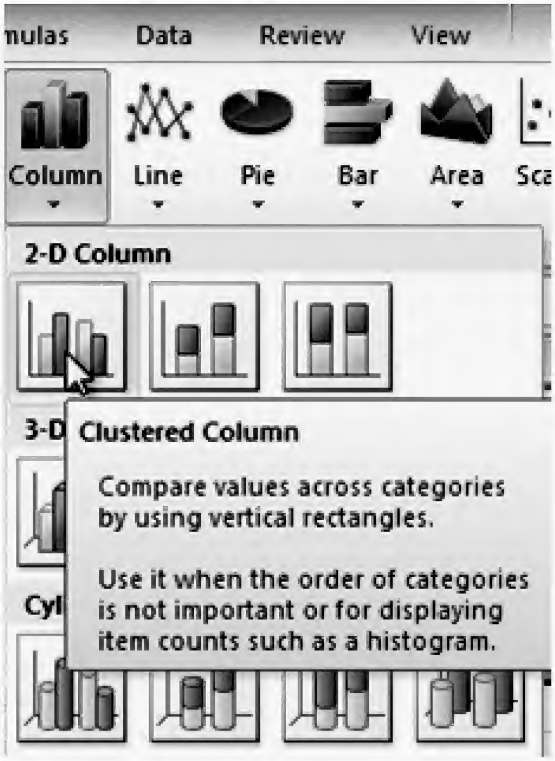


Figure 10.4: Chart Type Selection

4. The chart will appear in the worksheet as per figure below:

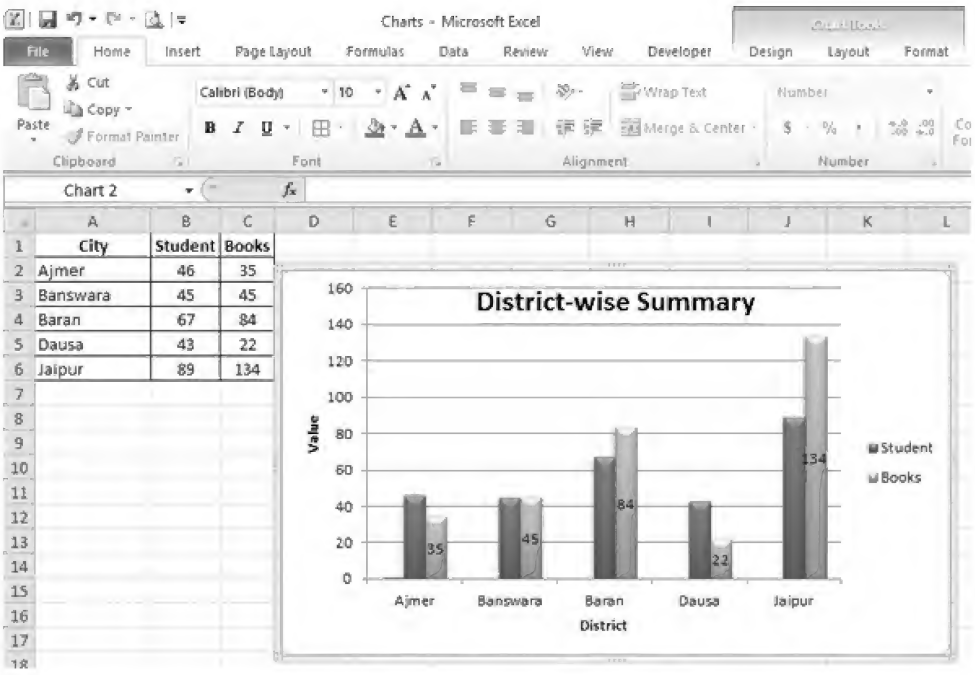


Figure 10.5: Column Chart

USEFUL TIP

Try creating all the charts from this data and see the resultant chart. You will get a better idea. If after or while creating a new chart, you decide that you want to see how yourdata would appear in a different kind of chart, all you have to do is click theChange Chart Type command button and see live preview of different options and decide your type.

10.1.4 Modifying a Chart

Once you insert a chart a set of chart tools consisting of three tabs will appear on the Ribbon. These are visible only when the chart is selected. You can use these three tabs to modify your chart.

Figure 10.6: Column Chart

Design Tab: Table below lists function of various command buttons displayed under command groups of Design Tab.

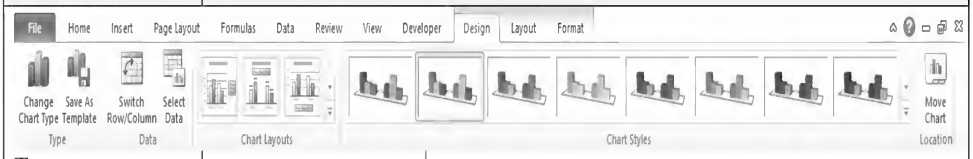
Command Group	Command Button	Function
		
Type	Change Chart type	Changes chart type to a different type
	Save as Template	Saves formatting and layout of the chart as a template for applying to future charts.
Data	Switch Row/column	Immediately swaps or interchanges worksheet data used for Legend entries with Axis Labels in the chart.
	Select Data	Changes source data range included in the chart
Chart Layouts	Quick Layout	Change overall layout of the chart
Chart Styles	Quick Styles	Change overall visual style of the chart
Location	Move Chart	Move chart to another tab or sheet in the workbook

Table 10.3 functions of various command buttons-Design Tab

Change Chart Type: Following diagram displays the process of changing a Chart Type:

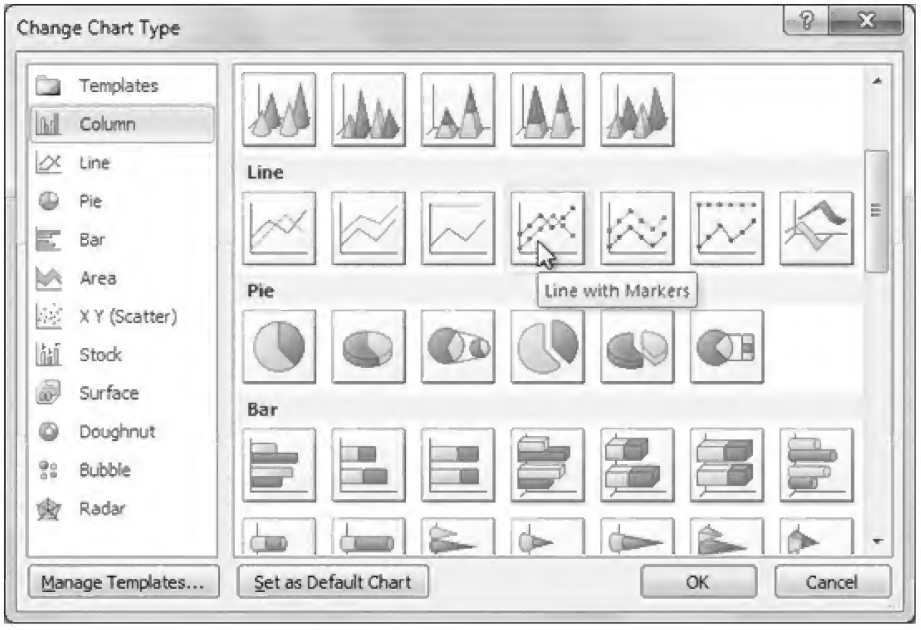


Figure 10.7: Changing Chart Type

USEFUL TIP

Some layouts already include chart titles, axes or legend labels. To edit them place the insertion point in the text and start typing.

Moving a Chart: Following diagram displays the process of moving a Chart:

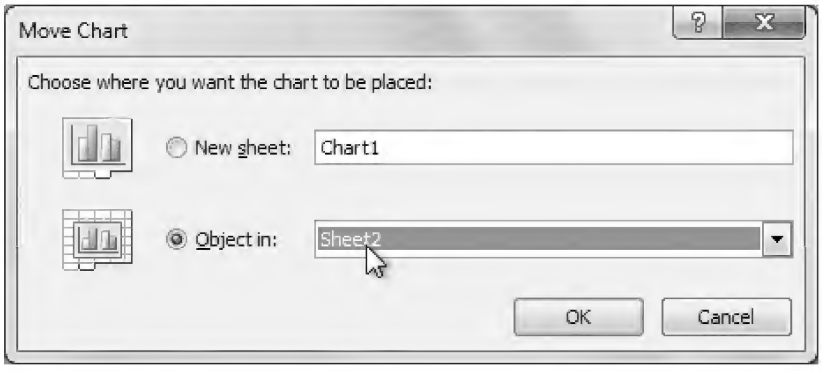
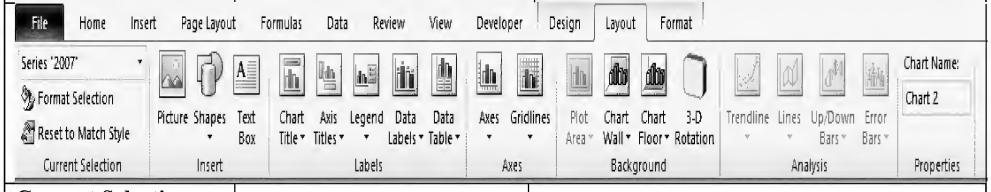


Figure 10.8: Moving a Chart

Customizing Chart Elements using Layout Tab: Table below lists function of various command buttons displayed under command groups of Layout Tab.

Command Group	Command Button	Function
		
Current Selection	Chart Elements	This combo box displays name of chart element currently selected in the chart and helps to directly select new element from the list of chart elements.
	Format Selection	Opens format dialog box for selected chart element for formatting.
	Reset to Match Style	Resets formatting changes made to selected chart element.

Command Group	Command Button	Function
Insert	Picture	Inserts a picture from a file
	Shapes	Inserts ready-made shapes such as rectangles, circles, arrows, lines, flowchart symbols, callouts etc.
	Text Box	Inserts a textbox
Labels	Chart Title	Adds, removes or positions Chart Title
	Axis Titles	Adds, removes or positions text used to label axis.
	Legend	Adds, removes or positions chart legend.
	Data Labels	Adds, removes or positions data labels.
	Data Table	Adds a data table to the chart.
Axes	Axes	Changes formatting and layout of each axis.
	Gridlines	Turns gridlines on or off.
Background	Plot Area	Turns plot area on or off.
	Chart Wall	Formats Chart's Walls
	Chart Floor	Formats 3D Chart's Floor
	3-D Rotation	Drop down menu enables you to change 3D viewpoint of chart like 3 -D shadow and rotation.
Analysis	Trendline	Adds trend lines to the chart
	Lines	Displays/hides drop lines or high-low lines
	Up/Down Bars	Adds up/down bars to chart that emphasize high and low values in a chart.
	Error Bars	Adds error bars to the chart
Properties	Chart Properties	Displays generic name of selected chart which can be edited to make it more descriptive.

Table 10.4 Functions of various command buttons-Layout Tab

Formatting Chart Elements using the Format Tab: Table below lists function of various command buttons displayed under command groups of Format Tab.

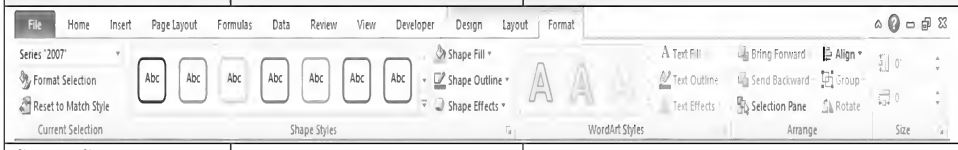
Command Group	Command Button	Function
		
Shape Styles	Shape Styles	Drop down gallery enables to preview and select Visual style of the chart element.
	Shape Fill	Displays a drop - down color palette for previewing and selecting fill color for chart element
	Shape Outline	Provides option to specify color, width and line style for outlining the chart element.
	Shape Effects	Applies visual effects to the selected chart element, such as shadow, glow, reflection or 3-D rotation.
WordArt Styles	WordArt Styles	Preview and select visual style for the text.
	Text Fill	Preview and select text fill color for selected titles of chart or to all titles if nothing is selected.
	Text Outline	Preview and select text outline for selected titles of chart or to all titles if nothing is selected.
	Text Effects	Applies visual effects to the selected chart element, such as shadow, glow, reflection or 3-D rotation.
Arrange	Bring Forward	Bring the selected object forward one level or to the front of all objects.
	Send Backward	Sends the selected object backward one level or behind all the objects.
	Selection Pane	Shows selection pane to help select individual objects and change their order or visibility.
	Align	Aligns the edges of multiple selected objects which can be centered or distributed evenly across the page.
	Group	Groups objects together so that they can be treated a single object.
	Rotate	Rotates or flips the selected object.
Size	Shape Height/Shape Width	Modifies height/width of the Shape/picture.

Table 10.5 Function of various command buttons-Formats Tab

QUICK REVIEW

- How will you create a new chart in Excel 2010?
- What are the different modifications that can be done to a chart using chart tools?

10.2 Sparkline

Excel 2010 version has introduced new types of miniature charts called Sparklines that fit into a single cell and represent trends or variations in collected data. It is also a convenient alternative to charts. Because of their compactness you can place a large number of them in your worksheets. For example, you could place one Sparkline on each row to show trends within that row.

In Excel 2010, Sparklines are of the height of the worksheet cells whose data they represent and is any one of following three types-

- Line which represents the selected worksheet data as a connected line showing their relative value. It is similar to a line chart.
- Column which represents the selected worksheet data as miniature columns. It is similar to a column chart.
- Win/Loss which represents the selected worksheet data as a win/loss chart where wins are represented by blue squares that appear above the red squares which represent losses. It is similar to column chart except that it only shows whether each value is positive or negative instead of how high or low the values are.

10.2.1 Why Sparklines?

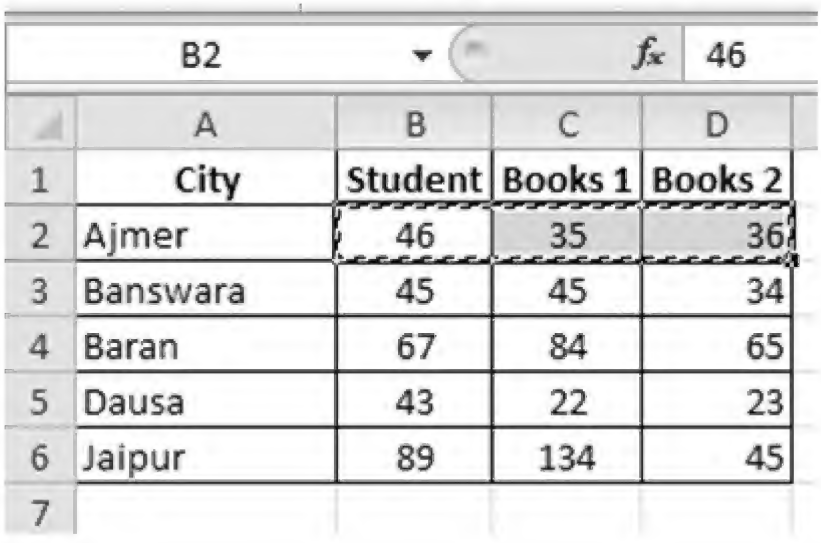
Sparklines are basically charts, so why should we use Sparklines instead of charts? Sparklines have certain advantages that make them more convenient in many cases. Let's say you have thousands of rows of data. If you place a Sparkline on each row, it will be right next to source data thereby making it easy to see the connections between the numbers and the Sparkline. If you used a traditional chart, it would need to have thousands of data series in order to represent all of the rows, and you would probably require scrolling a lot to find relevant data in the worksheet.

Ideally Sparklines are used in situations where you want to make the data clear and more eye catching, and where you don't need all of the features of a full chart. On the other hand charts are ideal for situations where you want to represent the data in greater detail and they are mostly better for comparing different data series.

10.2.2 Creating Sparklines

To add Sparklines to the cells of your worksheet, you need to follow these steps:

1. Select the cells in the worksheet with the data you want represented by a Sparkline as shown in figure below:



B2 | fx | 46

	A	B	C	D
1	City	Student	Books 1	Books 2
2	Ajmer	46	35	36
3	Banswara	45	45	34
4	Baran	67	84	65
5	Dausa	43	22	23
6	Jaipur	89	134	45
7				

Figure 10.9: Creating a Sparkline

2. Click the desired type of chart you want for your Sparkline in the Sparklines group of the Insert tab as displayed in figure 10.3.2

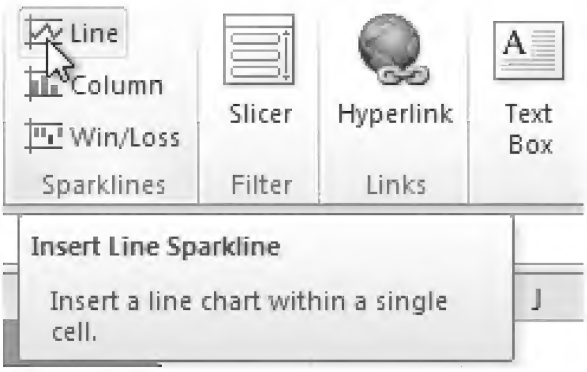


Figure 10.10: Select a Chart Type

3. Select the cell or range of cells where you want your Sparkline to appear in the Location Range text box as shown in Figure below and click OK.

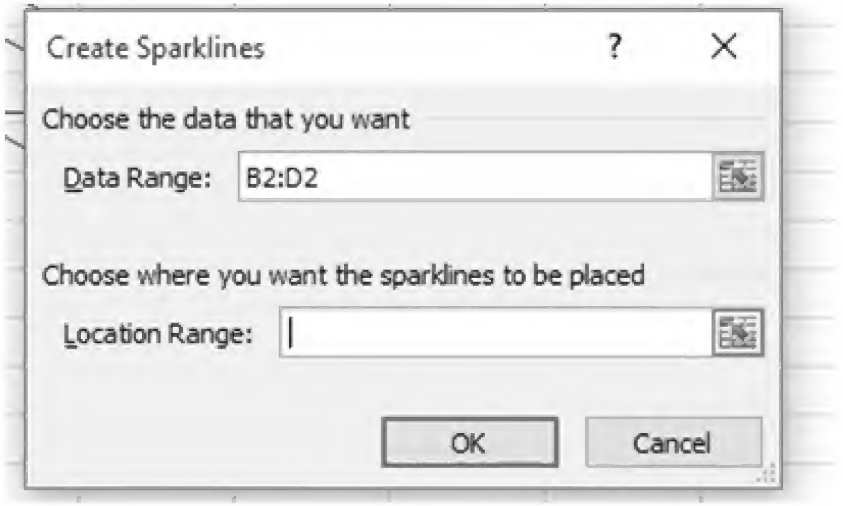


Figure 10.11: Defining Sparkline Location

B2 | fx | 46

	A	B	C	D	E
1	City	Student	Books 1	Books 2	
2	Ajmer	46	35	36	
3	Banswara	45	45	34	
4	Baran	67	84	65	
5	Dausa	43	22	23	
6	Jaipur	89	134	45	
7					

Figure 10.12: Sparkline Creation

USEFUL TIP

Just like with formulas, it is easy to create a single Sparkline first and then use the fill handle to automatically create Sparklines for the remaining rows.

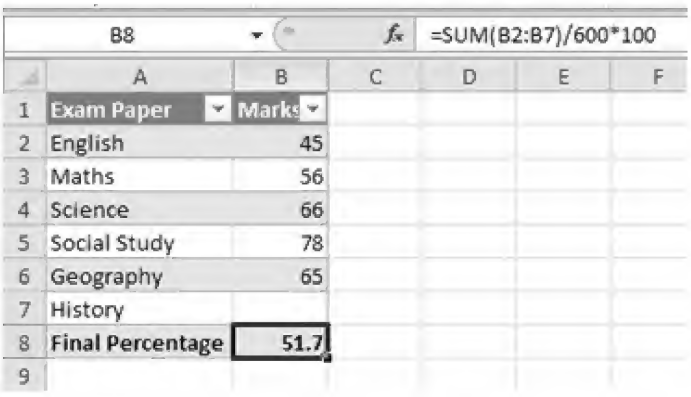
QUICK REVIEW

- What are Sparklines and how is it different from charts?
- How to create a Sparkline in Excel 2010? tools?
- When will you prefer Sparkline over chart?

10.3 Goal Seek

Goal Seek is a useful what-if analysis tool available in Excel. With **Goal Seek**, you can set a formula to a value that you would like to get as a result, and then specify one of the cells that the formula references as a cell that Excel can adjust in order to reach the goal. In simple words, **Goal Seek** lets you start with the desired result and it calculates the input value that will give you that result.

Let us understand this with an example. You have scored marks in various exam papers as shown in figure below. Final percentage calculated for all subjects is shown at cell **B8**. Now you need to know how many marks you need to score in History in order to achieve overall 55 final percentage.



B8 =SUM(B2:B7)/600*100

	A	B	C	D	E	F
1	Exam Paper	Marks				
2	English	45				
3	Maths	56				
4	Science	66				
5	Social Study	78				
6	Geography	65				
7	History					
8	Final Percentage	51.7				
9						

Figure 10.13: Goal Seek

From the **Data** tab, select Goal Seek from the drop down list of What-if-analysis command button as shown in figure below:

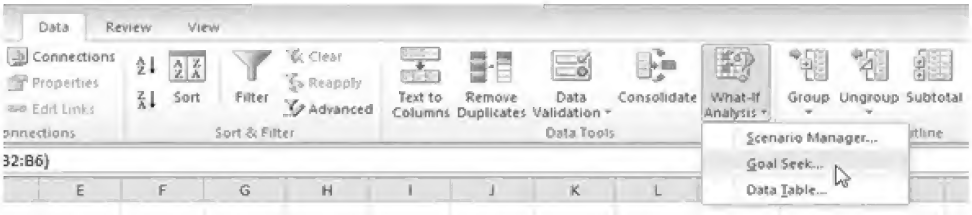


Figure 10.14: Goal Seek

1. A dialog box will appear with three fields:

   - Set Cell: This is the cell that will contain the desired result. It is B8 in our example.
   - To Value: This is the desired result. We will enter 55 because it is the final result required by us.

- By changing Cell: This is the cell where Goal Seek will give its answer. In our example, we'll select cell B8 because we want to determine the grade we need to earn on the final assignment.

2. When you're done, click **OK.**

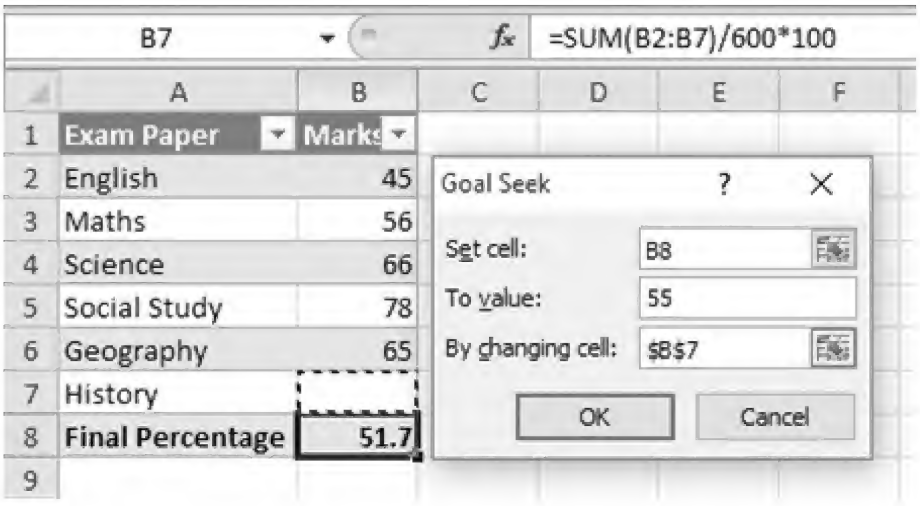


Figure 10.15: Goal Seek Dialogue Box

3. The dialog box will tell you if it found a solution to your goal. Click OK to proceed.

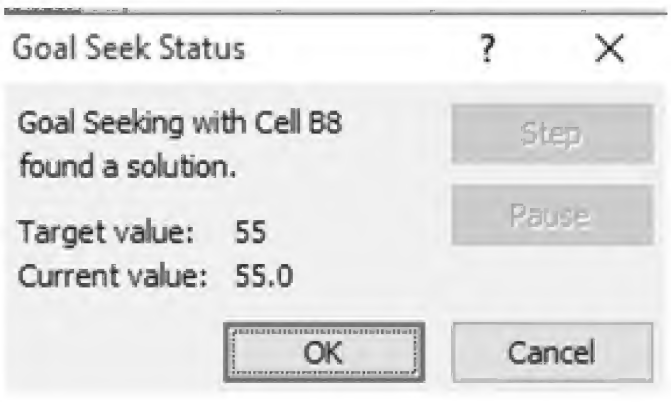
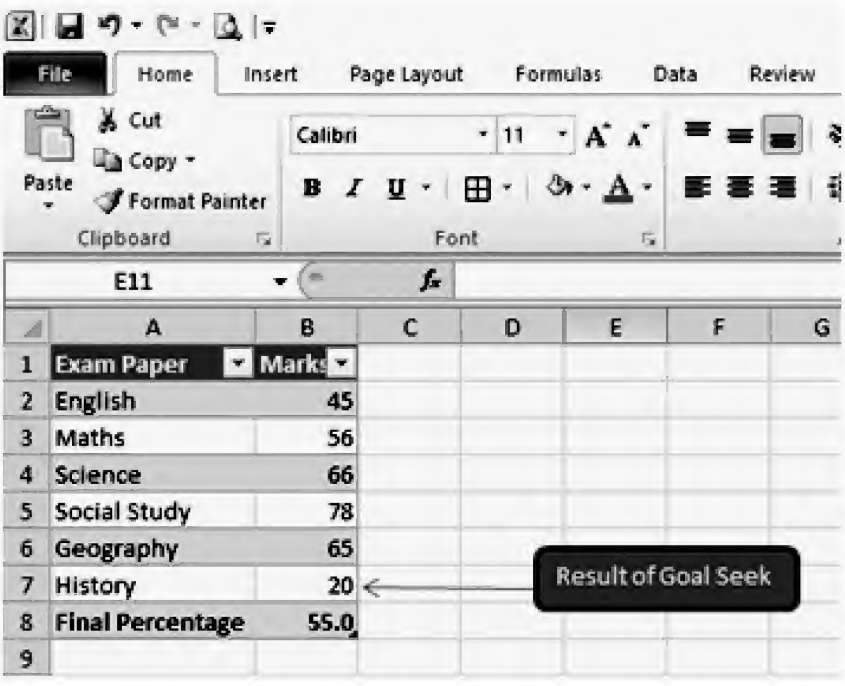


Figure 10.16: Goal Seek Dialogue Box

4. The result will appear in the specified cell. In our example, Goal Seek calculated that we will need to score at least a 20 in last paper to get 55% in total.



	A	B
1	Exam Paper	Marks
2	English	45
3	Maths	56
4	Science	66
5	Social Study	78
6	Geography	65
7	History	20
8	Final Percentage	55.0
9		

Figure 10.17: Goal Seek Result

QUICK REVIEW

- When will you use Goal seek in Excel 2010?
- Where do you find Goal seek in Excel 2010?

10.4 Data Analysis: Pivot Tables

PivotTable makes the data in your worksheets much more manageable by summarizing the data and allowing you to manipulate it in various ways. PivotTables can be a significant tool when we use it with huge and complex spreadsheets but they can be used with smaller spreadsheets as well.

A PivotTable is a powerful tool for exploring and analyzing information. It helps you organize and manipulate the raw data in your spreadsheet. With a PivotTable, you can suitably drag and drop columns of your data to different areas of the table to generate analytic reports. Ideally source data for a PivotTable should be organized like a traditional Excel table or database. It should have a row of unique column headings differentiating the data and there should be no empty columns spread within the data. Also blank rows in source data can limit the utility of your PivotTable.

10.4.1 Creating and Editing a Pivot Table

To generate a Pivot Table in Excel 2010:

1. Select the range of data that you want to base the table on
2. On the Insert Ribbon, Tables group, click the PivotTable button
3. Choose the table or range option when the Create Pivot Table dialogue box appears so that the PivotTable will be based on the Excel table or range you selected.
4. Once you select your data source, you can then choose to place your PivotTable in your Existing Worksheet or a New Worksheet.
5. Click OK to create your PivotTable

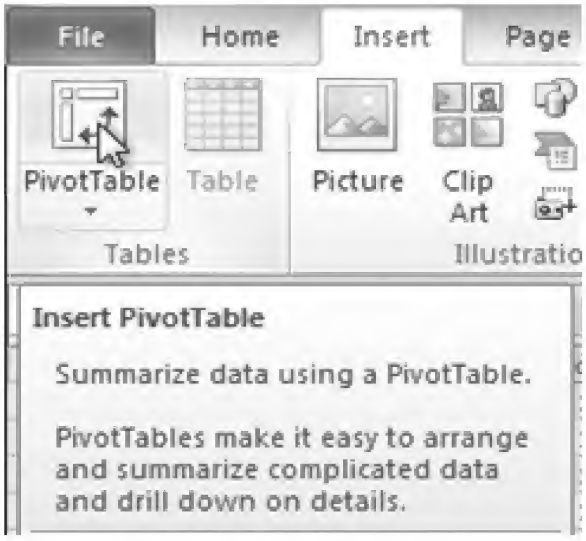


Figure 10.18: Pivot Table

Figure 10.19: Pivot Table

USEFUL TIP

Ensure that there are no empty rows or columns and that every column of data has a unique label.

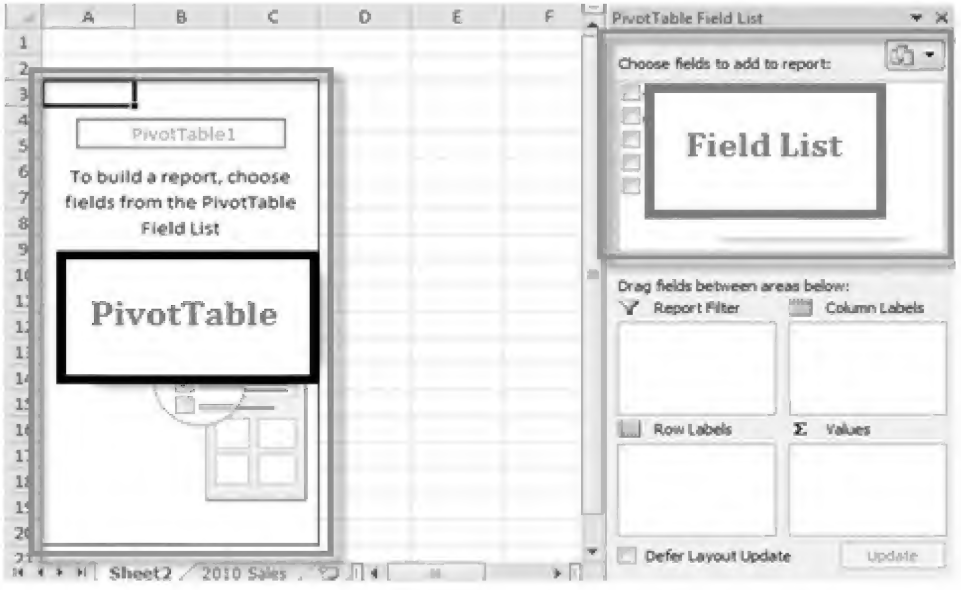


Figure 10.20: Pivot Table

Adding Fields to your Pivot Table

Once your Pivot Table appears you can add information to it by adding checks in the boxes along the headings in the Pivot Table field list or by dragging the fields to the labeled areas.

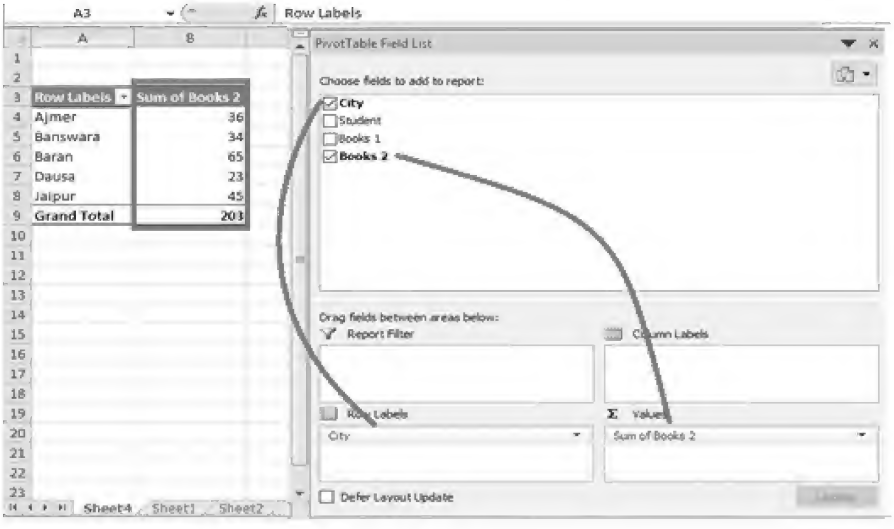


Figure 10.21: Adding fields in a Pivot Table

Pivot Table Areas

To make the best use of your Pivot Table you should understand what the various areas in a PivotTable and of what use. An empty Pivot Table frame is broken into four main areas namely Page, Data, Row and Column.

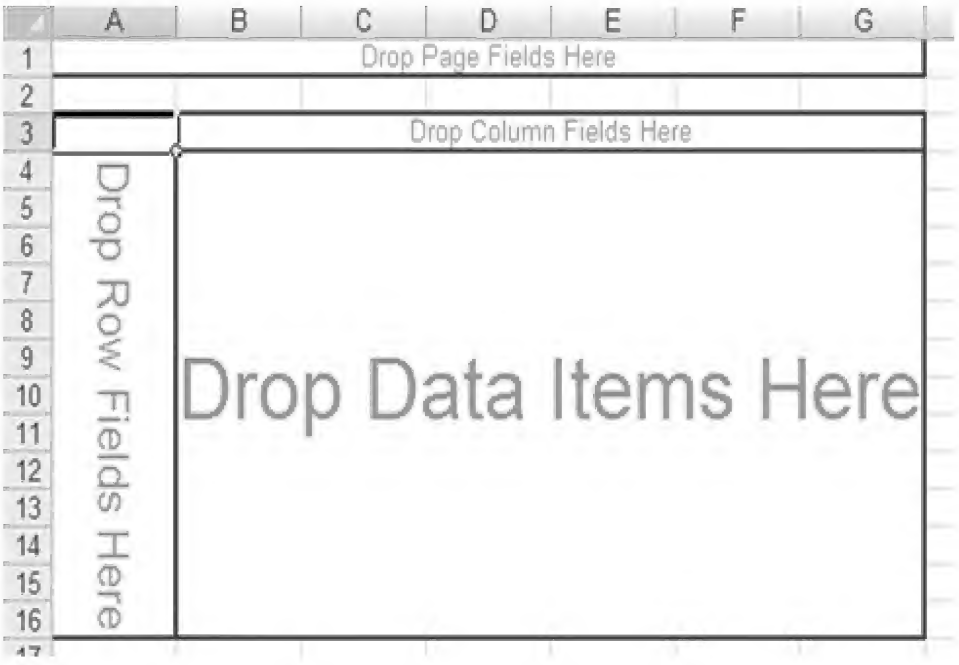


Figure 10.21: Pivot Table Areas

The Page Field area is ideally for column headings or fields that are used to identify periodic or organizational groupings of data in your other columns.The Data area provides the underlying context for the rest of the Pivot Table. The column heading you choose for the data area of the table normally has numeric values linked with it.

The Row and Column fields are used to categorize the data you want to examine. When you choose to place row and column fields in column headings you can see how your choices relate to each other in the context of the data being observed.

USEFUL TIP

Similar to normal worksheet data you can also sort the data in a PivotTable using the Sort & Filter command on Home tab. You can also apply any type of formatting. Howevernote that some types of formatting may disappear when you modify the PivotTable.

Rearranging Pivot Table Data

Once you have created a PivotTable it is easy to rearrange the data if required. You can rearrange the categories of data in your table by following a simple process of dragging headings out of the table and then replacing them with headings from the Pivot Table field list.

To change row labels:

1. Drag any of the existing fields out of the Row Labels area.
2. Drag a new field from the PivotTable Field List into the Row Labels area.
3. The Pivot Table will adjust to show the new data.

To add column labels:

To show multiple columns, you need to add column labels.

1. Drag a field from the PivotTable Field List into the Column Labels area.
2. The Pivot Table will now have multiple columns.

To refresh a PivotTable:

1. Click the Refresh button on the Data Ribbon or on the Options Ribbon or
2. Right click on a cell in the data area of the table and then click the Refresh Data option from the pop up menu.

USEFUL TIP

If you change any of the data in your source worksheet, the PivotTable will not update automatically. To manually update it, select the PivotTable and then go to Options Refresh.

QUICK REVIEW

- What are pivot tables and what are its applications?
- How to create a new pivot table?
- How will you add row/column labels in a pivot table?

10.5 New Features in Excel 2010

There are many new features in Excel 2010 which were not available in earlier versions. Some of the key features are listed in the table below.

New Feature	Location and Purpose
Conditional Formatting	**Home tab | Styles Group | Conditional Formatting** New options let you quickly visualize and comprehend data. Find more styles, icons, and data bar options as well as gradient fills with borders and solid fills to make it easier to add more visibility to your values.
Slicer	**PivotTable Tools Options Tab | Sort & Filter Group | Insert Slicer** **PivotChart Tools Analyze Tab | Data Group | Insert Slicer** Intuitively filter large amounts of data in fewer steps than before using new Slicer functionality and enhance your PivotTable and PivotChart visual analysis.
Search Filter	**Access through down arrow of Row/Column headings** Helps you easily find relevant items among potentially more than a million of available items in tables, PivotTable or PivotChart views.
Paste with Live Preview	**Home Tab | Clipboard Group | Paste options** It avoids repetitive hit and trials and you can effortlessly reuse content by previewing how it will look when it is copied and pasted
Recover unsaved versions	**File Tab | Backstage View | Info Tab | Versions | Manage Versions** If you are working on a workbook for a while and then accidentally close without saving, Excel 2010 lets you recover unsaved versions. You can view up to five AutoSaved versions of your files.
Equations	**Insert Tab | Symbols group | Equation** Creates and displays mathematical equations with editing tools.
Picture Editing Tools	**Insert Tab | Illustrations Group | Picture Tools format tab | Adjust Group | Artistic effects, Remove background, corrections and Color tools** Insert Tab | Illustrations Group | Picture Tools format tab | Size Group | Crop

Insert Screenshot	**Insert Tab | Illustrations | Screenshot** You can quickly insert screenshots in workbook without leaving application
Protected View	**Automatic access on opening a New File** Excel files received in e-mail or downloaded from internet automatically open in Protected View before exposing your computer to potential vulnerabilities. Settings can be changed from File Tab | Backstage View | Options | Trust center settings.

Table 10.6 Key features of MS Excel 2010

QUICK REVIEW

- What is the advantage of Paste with live preview feature?
- How is protected view useful?
- What is the use of slicers in Excel 2010?

Multiple Choice Questions

1. Which of the following Excel tools enables you to group and summarize information?

   a. Conditional Formatting

   b. PivotTable

   c. sorting

   d. field Lists

2. Which types of charts can be created using MS Excel 2010?

   a. Line graphs and pie charts only

   b. Only line graphs

   c. Bar charts, line graphs and pie charts

   d. Bar charts and line graphs only

3. The chart that shows the proportions of how one or more data elements relate to another data element is:

   a. XY Chart b. Line Chart

   c. Pie Chart d. Column Chart

4. Which chart is ideal for showing trends over time, where regular time intervals are plotted on the horizontal or x-axis?

   a. Pie chart b. Row chart

   c. Line chart d. Column chart

5. In MS Excel 2010, what is the keyboard shortcut (button or buttons to be pressed) for creating a chart from the selected cells?

   a. F3 b. F5

   c. F7 d. F11

6. In MS Excel 2010, Which PivotTable tools option updates the data in a Pivot Table or Pivot Chart report if the source data has changed?

   a. Format Report b. Pivot Table

   c. Refresh d. Show Detail

7. In Excel, a Data Series is defined as-

   a. A type of chart

   b. A cell reference

   c. A collection of related data

   d. A division of result

8. The box on the chart that contains the name of each individual record is called the-

   a. Cell b. Title

   c. Axis d. Legend

9. Tiny charts embedded in a cell that give a visual trend summary alongside your data are-

   a. Embedded charts b. Sparklines

   c. Chart styles d. Borderline

10. Which of the following Excel tools works backward from an objective to compute an unknown value?

    a. Goal Seek

    b. Custom Filter function

    c. PivotTable

    d. Boolean operator